

U.S. Navy Facilities



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Atlantic Test Range (ATR)

Naval Air Warfare Center - Aircraft Division

Patuxent River, MD

TYPE OF FACILITY: Outdoor, dynamic

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ATR, Atlantic Ranges & Facilities
NAVAIRWARCENACDIV
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PERTINENT TESTING: Dynamic in-flight RCS, J/S and chaff measurements of full-size aircraft. Electronic Warfare and avionics systems stimulation and characterization also supported.

FACILITY DESCRIPTION: The Atlantic Test Range is a dynamic in-flight test facility controlling 2400 square miles of restricted airspace. Located on the western shore of the Chesapeake Bay overlooking water facilitates measurements in a low clutter environment. Real-time, simultaneous multi-frequency RCS measurements available from 150 MHz to 35 GHz. Pre-flight profiles are generated to minimize flight collection time. Data collected is pulse-to-pulse to allow determination of probability distribution functions (PDF). Dynamic ISAR and Doppler measurements are also available from 2-18 GHz.

RANGE LENGTH: Variable, 3-20 nautical miles

FREQUENCY COVERAGE: 150 MHz - 35 GHz

POLARIZATION COVERAGE: HH, VV

DYNAMIC RANGE: >80 dB

RANGE RESOLUTION: 1 foot

TARGET SUPPORTS: Not Applicable

TARGET LIMITATIONS: Target must fly or float

DATA PROCESSING: Real-time RCS measurements data products are polar plots and statistics (PDF) with multiple signal sources. Data can be simultaneously collected at up to 80 frequencies between 2-18 GHz. Post-processing data products include high-resolution down range profiles, 2-D ISAR imagery and Target Doppler Signature.

OTHER PROVISIONS: Airspace is restricted (R4005/R4006/R4007) and surveillance is available. Night flights are scheduled for restricted visual access. Ground radar facility access is controlled and classified data processing is available.

Atlantic Test Range RCS Measurement Facility - Antenna Site



Atlantic Test Range Real-Time RCS Engineering Workstation



Deployable Signature Measurement System (DSMS)

Naval Surface Warfare Center - Carderock Division
Bethesda, MD

TYPE OF FACILITY: Helicopter or Shelter, dynamic
POINT OF CONTACT: Richard Pokrass
NSWC-Carderock Division - Code 734
Bethesda, MD 20084
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Fax: (301) 227-2710
E-mail: pokrass@dt.navy.mil
PERTINENT TESTING: RCS, IR and EO measurements of full-size air, land and sea vehicles.
FACILITY DESCRIPTION: Facility performs RCS, IR and EO field measurements on full-scale targets from either a fully self-contained instrumentation shelter or from an SH-60 helicopter. Lookdown capabilities in the helo range from 10 degrees up to 90 degrees down.
RANGE LENGTH: Variable 1 to 7 miles
FREQUENCY COVERAGE: 2-4 GHz, 8-18 GHz Continuous, 2.5 - 5 nm, 8-12 nm, 400-1000 nm
POLARIZATION COVERAGE: HH, VV, HV, VH
DYNAMIC RANGE: RF: 66 dB instantaneous, 138 dB total; IR: 300 degrees
RANGE RESOLUTION: 0.13 - 0.26 foot (parameter dependent)
TARGET SUPPORTS: Not Applicable
TARGET LIMITATIONS: Not Applicable
TARGET STORAGE: Not Applicable
DATA PROCESSING: Full processing capability at both DSMS shelter and Carderock Division. RCS products include polar plots, statistics, high-resolution down-range profiles, 2-D ISAR images, etc. IR/EO processing includes image data review, image calibration, target signature, extrapolation to standard conditions.

Deployable Signature Measurement System (DSMS)



Radar Image Measurement System (RIMS)

Naval Surface Warfare Center - Carderock Division

Bethesda, MD

TYPE OF FACILITY: Outdoor, mobile; indoor, static

POINT OF CONTACT: Bill Stephens
CARDEROCKDIV NSWC/Code 7310
9500 MacArthur Blvd.
West Bethesda, MD 20817-5700
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PERTINENT TESTING: Indoor and outdoor RCS measurements of ship models and full-scale ships.

FACILITY DESCRIPTION: Facility performs dynamic RCS field measurements on full-scale ships, land, and air targets from a fully self-contained instrumentation van. Facility also performs RCS measurements on models in an indoor 200 x 300-foot pool of water with wave (up to sea state five) and wind (up to 25 knots) capabilities. Lookdown capability up to 30 degrees from adjustable 40-foot antenna tower.

RANGE LENGTH: 20-300 feet (indoor); up to 10 miles (outdoor)

FREQUENCY COVERAGE: 2-4, 8-18 GHz Continuous; (33-38, 94-96 GHz in FY99)

POLARIZATION COVERAGE: HH, VV, HV, VH

DYNAMIC RANGE: 66 dB instantaneous, 136 dB total (12 bit A/Ds)

RANGE RESOLUTION: 0.03 meter (waveform dependent)

TARGET SUPPORTS: Indoor: Underwater rotator
Outdoor: Orbit rotator

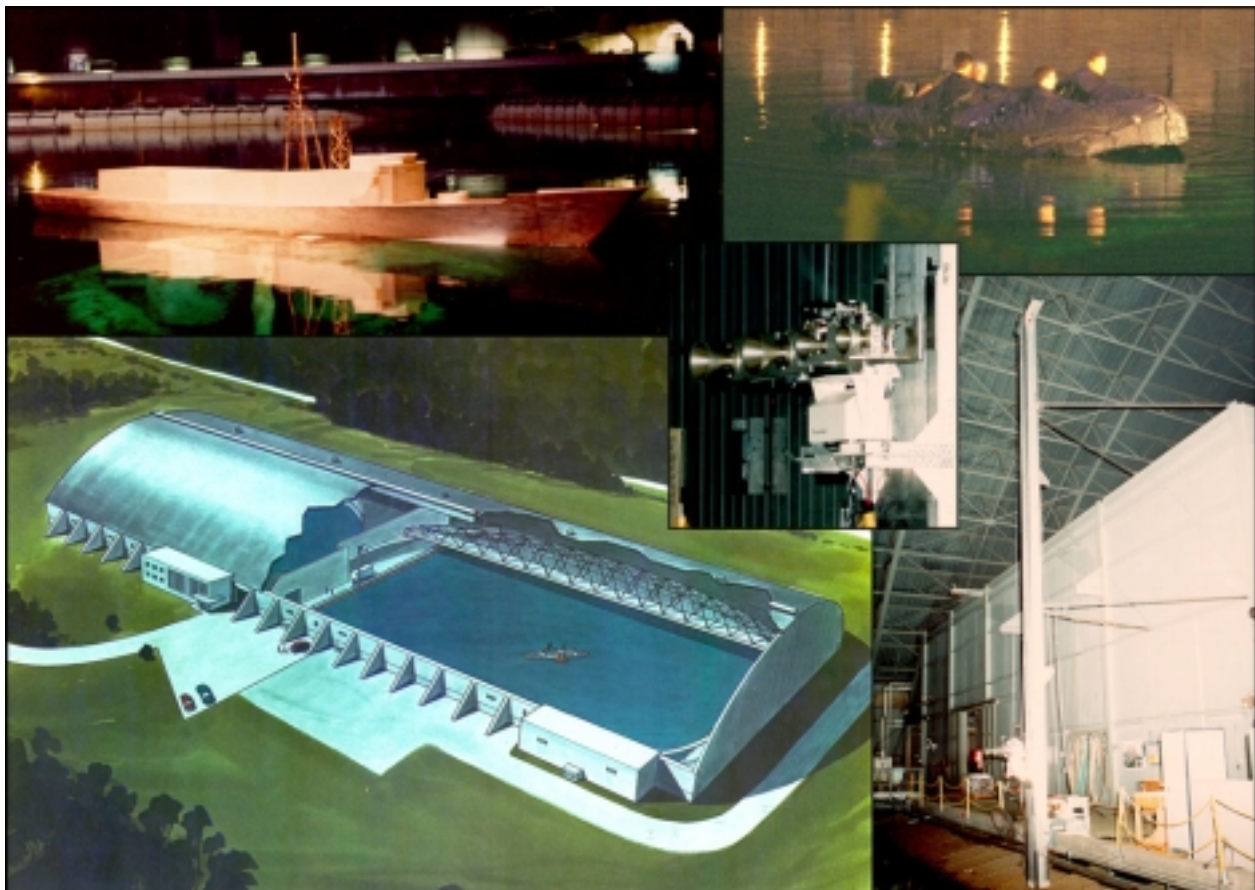
TARGET LIMITATIONS: Indoor Rotator: 12,000 pounds and 50 foot
Outdoor Rotator: 1,250 pounds
Dynamic Targets: Not applicable

TARGET STORAGE: Secure storage area available

DATA PROCESSING: Full processing capability within instrumentation van and at Carderock Division's main radar data reduction facility. Data products include polar plots, statistics, high-resolution down-range profiles, 2D ISAR images and ground-truth data.



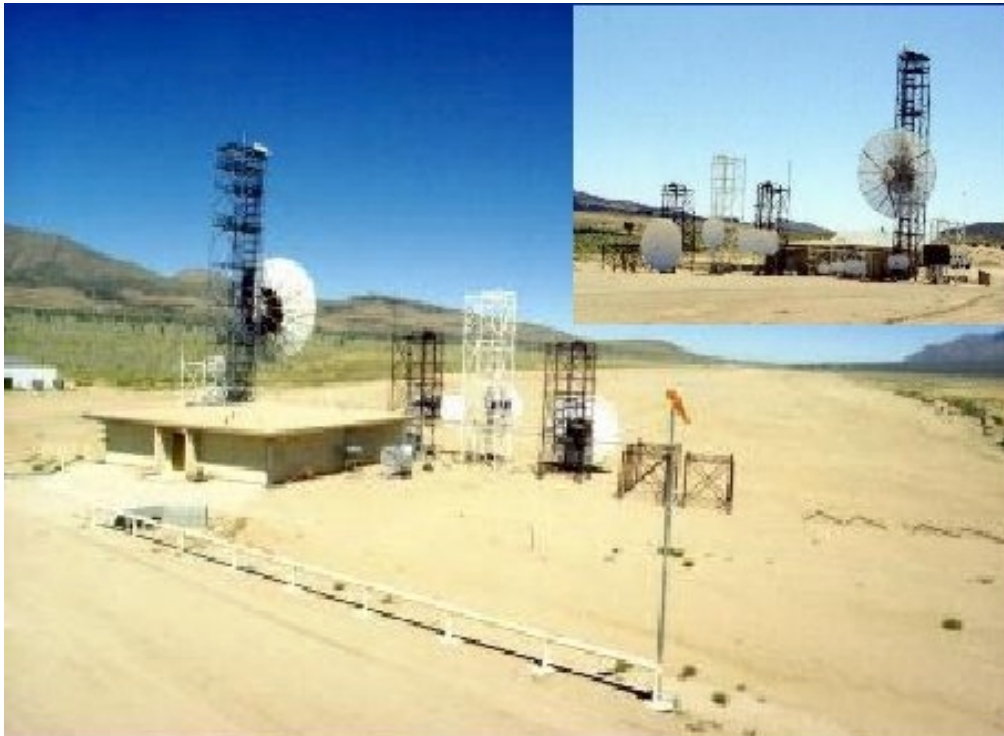
Radar Imaging Measurement System (RIMS)



Junction Ranch - Horizontal Range

Naval Air Warfare Center - Weapons Division
China Lake, CA

TYPE OF FACILITY: Outdoor, static, ground-bounce
POINT OF CONTACT: Dick Dickson
NAVAIRWARCENWEPDIV/Code 526300D
China Lake, CA 93555-6001
Phone: (760) 939-9262 [DSN: 437]
Fax: (760) 939-6465
E-mail:
PERTINENT TESTING: Full-size missiles, aircraft, tanks and trucks. Bistatic and full-scatter matrix testing available. High power microwave (HPM), Rocket Motor Plume measurements with mobile RCS system.
FACILITY DESCRIPTION: The JR Horizontal Range is located in a remote valley of the North ranges at China lake which limits visual access and features a high security and low RFI environment due to surrounding mountains.
RANGE LENGTH: 4,000 feet
FREQUENCY COVERAGE: 30-150 MHz; 0.15-18 GHz; 34-36.5 GHz
POLARIZATION COVERAGE: HH, VV, HV, VH, conversion to circular
DYNAMIC RANGE: >60 dB (single pulse)
RANGE RESOLUTION: <3 inches (function of bandwidth)
TARGET SUPPORTS: 40-foot 5,000 pound ogive pylon; 30,000 pound foam columns; 30-foot 100,000 pound turntable; 200,000 pound 3-axis turntable.
TARGET PIT LOCATIONS: 700, 2000, 4000 feet (5500 feet planned)
TARGET STORAGE: Three storage/work barns with data safes and STU-3 phones
DATA PROCESSING: Real-time processing to generate all typical RCS data products such as RCS-vs-azimuth, ISAR images, global range, global RCS, down-range RCS plots, monostatic and X-band bistatic. Off-line processing adds ASCII translation, Doppler processing, etc.



The Junction Ranch South Forty Antenna Farm and 4000' Horizontal Bounce Range



40-Foot Support Pylon at South Forty Bounce Range

Junction Ranch - Look-Down Range

Naval Air Warfare Center - Weapons Division
China Lake, CA

TYPE OF FACILITY: Outdoor, static, look-down
POINT OF CONTACT: Dick Dickson
NAVAIRWARCENWEPDIV/Code 526300D
China Lake, CA 93555-6001
Phone: (760) 939-9262 [DSN: 437]
Fax: (760) 939-6465
E-mail:
PERTINENT TESTING: Wide-band monostatic, full-scattering matrix testing of ship models in a simulated ocean environment.
FACILITY DESCRIPTION: The JR look-Down Range has a 10-degree lookdown angle from antennas on a mountain peak to a 80 x 110-foot water site. The lookdown angle to the 98 x 140-foot tilt deck can be varied from 5 to 32 degrees..
RANGE LENGTH: 17,000 feet
FREQUENCY COVERAGE: 2-4 GHz; 8.2-18 GHz; 34-36.5 GHz
POLARIZATION COVERAGE: HH, VV, HV, VH, conversion to circular
DYNAMIC RANGE: >60 dB (single pulse)
RANGE RESOLUTION: <3 inches (function of bandwidth)
TARGET SUPPORTS: 30-foot 10,000 turntables located on tilt-deck and water site.
TARGET PIT LOCATION: 17,000 feet
TARGET STORAGE: Two storage/work barns.
DATA PROCESSING: Real-time processing to generate all typical RCS data products such as RCS-vs-azimuth, ISAR images, global range, global RCS, down-range RCS plots, monostatic and X-band bistatic. Off-line processing adds ASCII translation, Doppler processing, etc.



**Look Down Range – North Forty Target Area
with Tilt Deck and Wet Site (inset)**

Look Down Range Parrot Peak Radar Site



Radar Reflectivity Laboratory

Naval Air Warfare Center - Weapons Division
Point Mugu, CA

TYPE OF FACILITY: Indoor, static (chamber, anechoic, microwave)
POINT OF CONTACT: Donald P. Hilliard, NAWCWPNS Code 471430E
 Point Mugu, CA 93042-5001
 Phone: (805) 989-8885/9370 [DSN: 351] Fax: (805) 989-5067
 E-mail: HilliadDP@navair.navy.mil or YatesWT@navair.navy.mil
 Web: <http://www.nawcwpns.navy.mil/~rrl>

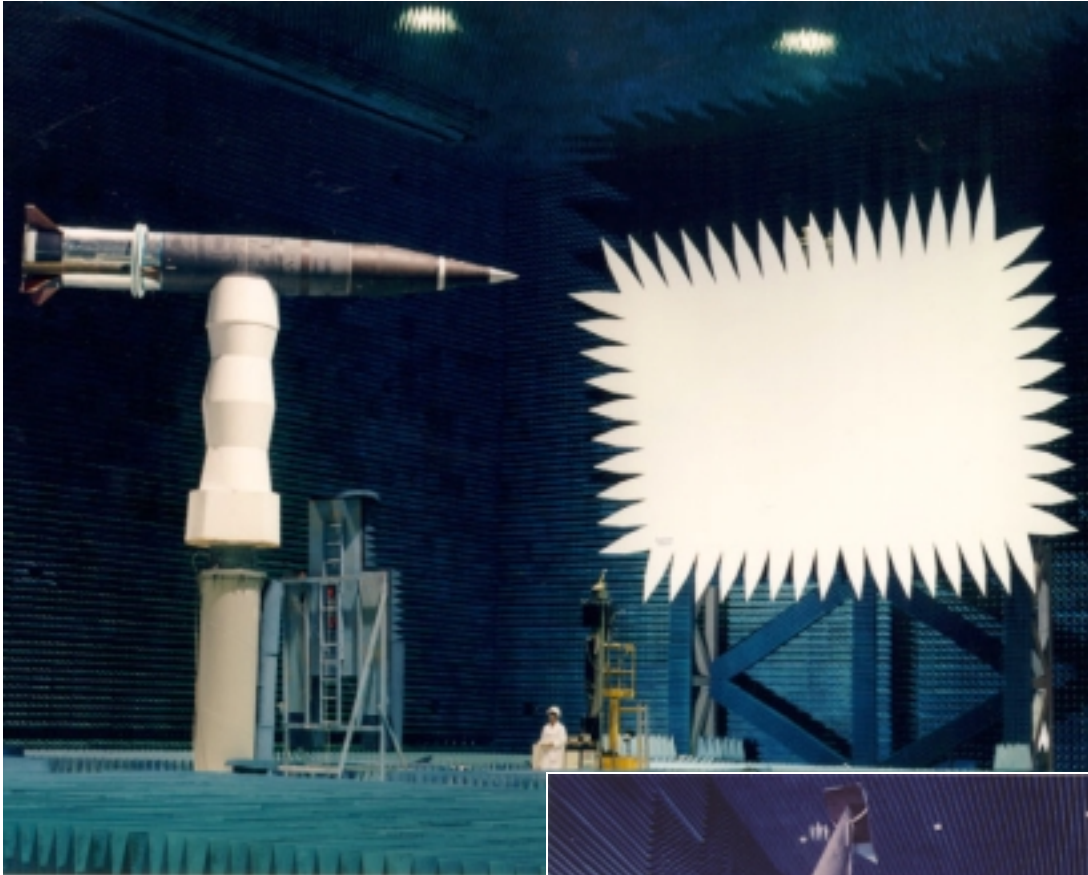
PERTINENT TESTING: Far-field RCS, bistatic RCS measurements of full-size missiles, targets, RVs and components, scale model aircraft and ships for survivability analyses, weapons systems flight tests, production/QA testing, diagnostic testing, and development of scattering models.

FACILITY DESCRIPTION: Three anechoic chambers designed for both near- & far-field monostatic & near-field vertical- & horizontal-plane bistatic RCS measurements.

| | Bistatic Anechoic | Large Anechoic | Small Anechoic |
|------------------------------|---|---|--------------------------------------|
| CHAMBER: | | | |
| CHAMBER SIZE (LxWxH): | 150x150x60 feet | 100x40x40 feet | 75x27x15 feet |
| RANGE TYPE: | Far-Field | Far-Field | Near-Field |
| RANGE LENGTH: | 96 feet | 72 feet | 50 feet |
| QUIET ZONE (LxWxH): | 30x30x18 feet | 16x16x6 feet | 8x8x4 feet |
| RADAR: | Lintek 5000, Linear FM | Lintek 5000, Linear FM | Linear FM |
| BISTATIC COVERAGE: | 0-180° Horizontal | Monostatic | 0-20° Horizontal |
| (near field) | 0-90° Vertical | 0-12° Vert or Horiz | |
| FREQUENCY | VHF, UHF, L, S, C, X, | L, S, C, X, Ku, Ka, | L, S, C, X, Ku, |
| COVERAGE: | Ku, Ka, V, W | V, W | Ka, V, W |
| POLARIZATION | Full Polarization | Any Single Linear | Any Single Linear |
| COVERAGE: | Matrix | Combination | Combination |
| DYNAMIC RANGE: | >90 dB* | >90 dB* | >90 dB* |
| RANGE RESOLUTION: | <1 cm** | <1 cm** | <1 cm** |
| TARGET SUPPORTS: | 3000, 1500, 500 lb. Pylons, Foam Columns, 3000 LB positioner | 1500, 500 lb. Pylons, Foam Columns, 10000 lb. positioner | Foam Columns, 2500 lb. positioner |
| TARGET LIMITATIONS: | <30,000 pounds <30 feet | <10,000 pounds <16 feet | <2,500 pounds <8 feet |
| DATA PROCESSING: | All RCS data products such as high-resolution ISAR images; RCS-vs-azimuth, down-range RCS, global range, global RCS, & range-Doppler plots; n-point scatterer target signature & background/clutter modeling. | | |

* Dynamic range without averaging ** Range resolution dependent on bandwidth

Bistatic Anechoic Chamber



Large Anechoic Chamber



Ship & Aircraft HRR/RCS Measurement Facility

Space and Naval Warfare Systems Center
San Diego, CA

TYPE OF FACILITY: Outdoor, dynamic
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San Diego, CA 92152-5001
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E-mail: eejones@spawar.navy.mil
PERTINENT TESTING: Measurement of high-resolution radar (HRR) signatures of full-size ships and aircraft for target classification and RCS diagnostics.
FACILITY DESCRIPTION: Radar site is located 120 feet above sea level viewing 180 degrees of ocean off Point Loma, CA where military and commercial ship and aircraft targets can be scheduled. This cost-effective facility produces calibrated RCS, HRR signatures, signal modulation signatures and ISAR images at S, X, Ku and millimeter bands.
RANGE LENGTH: variable, 1-10 nautical miles
FREQUENCY COVERAGE: 3.0-3.5 GHz, 9.0-9.5 GHz, 13.8-14.3 GHz, 49.0-49.5 GHz
POLARIZATION COVERAGE: HH, VV
DYNAMIC RANGE: 85 dB
RANGE RESOLUTION: 1 foot
TARGET SUPPORTS: Not Applicable
TARGET LIMITATIONS: Not Applicable
TARGET STORAGE: Not Applicable
DATA PROCESSING: Near real-time data processing includes polar plots, histograms, statistics, track plots, telemetry plots, hourglass plots, range profiles, and ISAR images with target overlays.

Radar Measurement Range at SPAWAR Systems Center



SPAWAR Systems Center Facilities

